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Tepe, Markus

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About the author

Markus Tepe is senior researcher at the Center for Social Science Methodology at the Carl von Ossietzky University Oldenburg. He obtained his doctoral degree at the Free University Berlin for a comparative study on "Regimes, Institutions and Temporality in the Political Economy of Welfare Reform". His research centers on comparative political economy, and has appeared in journals such as Public Choice and the Journal of Public Policy.

Abstract

Although cross-national evidence on public employment is rather fragmented or outdated, downsizing and inherently growing personnel costs have been acknowledged as two distinctive features of public employment in affluent democracies. This study employs a new panel dataset on the size and costs of public administration employment in 17 OECD nations from 1995 to 2005 to explore these presumptions empirically. First, by decomposing public sector employment we find that the health and education sector has been the primary venue of employment reform, whereas "core" public administration employment has hardly changed over the last 10 years. Second, although public employees' compensation expenditure appears to demand a growing fraction of government budgets, the majority of countries managed to contain public personnel expenditure in absolute terms. Thirdly, exploring the functional relationship between the costs and the size of public administration employment indicates that policymakers reduce public administration employment in response to overall fiscal constraints rather than growing personnel costs. In sum, these results neither support alarmist predictions of a looming public personnel cost-explosion nor a radical downsizing of pubic employment.

Keywords

Public administration employment, public employees' compensation expenditure, Baumol's cost disease, cross-sectional time-series regression

Introduction

Even though public employment is a key resource of modern statehood, there has been little effort in either measuring or explaining the dynamics of public employment across countries. Exceptions may include the work of Rose et al. (1985), who have most extensively studied public employment in Western countries, Cusack et al. (1989) in collecting comparative public employment data and more recent attempts by Parry (2007) using disaggregated OECD expenditure data. Despite these contributions, today, cross-national evidence on public employment remains fragmented or outdated. A primary obstacle in comparative research is the availability of consistent public employment data. Since national statistical offices present very different measures with respect to horizontal aggregation (central, state, and regional level employees) and the underlying concept of public employment, aggregating figures from national statistical offices can be a daunting task. This study suggests an alternative approach, utilizing micro level data from comparative household and labour force surveys to compare the development of public administration employment across countries.

Irrespective of these methodological issues, there are at least two basic statements that can be found in the comparative public administration literature (Pollitt and Bouckaert. 2004; Rothenbacher. 1998; Suleiman. 2003) as well as in public debates about the role of the state as an employer: 1) The downsizing of public personnel and, 2) growing personnel costs (Parry 2007). Public employees' compensation expenditure is still amongst the single most important spending category in governments' budget. Within our sample of 17 OECD nations, average government expenditure on employees' compensation amounted to 24 percent of total government expenditure and 11 percent per GDP (in 2005). Thus, in times of fiscal austerity, it does not come as a surprise that the downsizing of public employment and the containment of personnel costs becomes a core issue on the public policy agenda. Apart from the general obstacles that retrenchment policies regularly encounter, reducing public employment is likely to become a particularly challenging endeavour, as the state traditionally served as a role model employer for the private sector. Obviously, this ideal picture has changed during the last decades as New Public Management (NPM) reforms changed the public sector landscape in nearly all OECD countries (Pollitt and Bouckaert 2004).

This study supplements the work of Parry (2007) and aims to contribute to the comparative public administration literature in two ways: First, in providing new comparative measures on the size and costs of public administration employment in 17 OECD nations from 1995 to 2005, we investigate whether processes of downsizing and growing personnel costs can be identified within these countries. In doing so, we are focusing on public administration rather than overall public sector employment, as our primary concern is not public service privatisation but the changing role of the state as an employer. Secondly, we explore the functional relationship between the size and the costs of public personnel. Applying dynamic panel regression analysis we test whether policymakers downsize public administration employment in response to growing personnel costs.

The remainder of the study is organized as follows: The second section revises existing evidence on downsizing and growing personnel costs and derives a testable hypothesis on the functional relationship between the costs and the size of public employment. In the third section, we present our methodological approach to obtain comparative measures on public administration employment and public employees' compensation expenditure. Results of the descriptive and multivariate analysis are presented in the fourth section. The last section discusses the limitations and implications of findings for further research.

Theory and hypothesis

Public employment downsizing

Prior studies exploring the development of overall public sector employment between the 70s and mid 90s indicate that the size of the public workforce has been reduced (Suleiman 2003: 115, Cusack et al. 1989, Rothenbacher 1998, Pollitt and Bouckaert 2004: 44). From the investigation of long-term trends in government employment in Belgium, Germany, France, Sweden and the UK, Rothenbacher (1997) concludes that the main development that characterizes public sector employment is a decline after a long growth period. The downsizing of public employment has been considered as a consequence of the privatisation of public services and public infrastructure (energy, railway, postal services and telecommunication). Even though privatisation might require setting up new regulatory agencies that demand new public servants, the gross effect of privatising public services on public employment is supposed to be negative.

A second process, which might have affected the size of public employment, is welfare reform. With increasing budgetary pressure from demographic change and new labour market trends, many OECD countries tried to improve the fiscal sustainability of their welfare system by demanding more private responsibility. Even though the intensity by which public provision has been substituted by private forms of welfare service provisions (e.g. in public health, education or old-age security) varies across countries, we cannot exclude the possibility that these changes also affect the level of public employment. At this stage, however, we will simply use the size of employment in welfare related sectors as a reference point to evaluate the development of "core" public administration employment.

Focusing on public administration employment, more recent attempts to modernize public administrations motivated by NPM ideas are of particular interest (OECD. 2004; OECD. 2005; OECD. 2007). These ideas are compelling to policymakers with scare fiscal resources, as NPM suggests improving the efficiency of public service provision without demanding more financial resources. The basic idea is to impose private sector steering mechanisms - including human resource policies - on so far bureaucratic administrations. In contrast to the privatisation of public service or welfare services, these reforms are directly aiming at public administration employees. To this end, we will primarily consider the development of public administration employment rather than overall public sector employees.

Growing public employees' compensation costs

The political debate about the "right" size of public employment is often deeply rooted in fiscal considerations. In this context, the seminal work of Baumol and Bowen (1966) has become something of a modern classic in public administration literature even though the concept as such does not exclusively apply to the public sector. Baumol and Bowen (1966) drew attention to the phenomenon of continuing and compounded rise in real costs of person-based services. They found that the productivity growth in the manufacturing sector was systematically higher than productivity growth in the service sector, which is known to produce person-based services. In the long-run, wages rise according to overall productivity growth rather than sector specific productivity growth, service sector employees' wages grew beyond their productivity increase. The services that are affected by the so-called "Baumol cost disease" are services that require personal touch such as social care, education and public administration. Baumol (1993) argues that productivity growth of these services lags behind the manufacturing sector, because personal services are mostly inconsistent with any standardization and second, because the quality of these services is inevitably linked to the amount of human labour. It is assumed that this cost disease mechanism is particularly strong in public administration (Baumol and Bowen 1966, Baumol 1993), as the public sector is primarily concerned with the production of personal services. Even though Baumol (1993: 23) does not deny an increase in the productivity of public servants, in his view productivity growth in public administration means that the real costs are slowly declining, despite the dramatic inflation of their money prices. Advocates of a smaller state frequently refer to this argument in order to claim a reduction of public spending, whereas, on the other hand, there is no doubt that technological progress has led to drastic improvements in public administration employees' productivity, e.g. via telecommunication and other internet based technologies.

Up to now, this debate could not be settled, as the primary obstacle in investigating the validity of Baumol's cost disease in public administration lies in a lack of empirical exploration. Although we might know the costs of production inputs (personnel, facilities, PC's, etc.) there is neither a coherent concept nor appropriate data to capture the output of a bureaucracy and thereby the productivity of its personnel (Hedley. 1998). Plagued with these empirical limitations we decided to explore a more simplistic assumption, derived from the cost disease argument: If personnel costs are inherently growing, we expect, that personnel costs outweigh non-personnel expenditure in the long run. Thus, the share of government expenditure devoted to employees' compensation, measured as the share of overall government expenditure, is predicted to grow.

The functional relationship between size and costs

Taking into account that both trends - downsizing and cost disease - take place simultaneously the question is, whether one causes another. In the aftermath of large scale privatisation of public services in the mid 90s, it has been argued that public sector employment has passed its peak and has been declining ever since

(Rothenbacher 1998). In the context of growing fiscal austerity it is assumed that policy makers' dominant response toward growing personnel cost is the reduction of public administration employment via privatisation (Suleiman 2003, Rothenbacher 1998). Yet, it remains to be an empirical question whether growing public employees' compensation expenditure also induces policymakers to reduce "core" public administration employment.

There are at least two arguments that would question the empirical validity of such a deterministic relationship. Prior studies exploring the effect of fiscal austerity on welfare spending suggest that office-oriented policymakers have limited willingness to scale down popular welfare services as such attempts involve high risks of electoral punishment. Reducing public administration employment could have a double negative effect: On the one hand cutting back public employment puts into question the role model function of the state as an employer, while on the other hand such attempts are likely to cost votes among public employees. Moreover, even if policymakers are willing to cutback public administration employment it remains questionable if they have the capacity to do so. Public employees in general and civil servants in particular are known to enjoy a privileged status compared to private sector employees not only with respect to earnings generosity and working conditions but also with respect to employment protection. Thus, if policymakers intend to consolidate public budgets via public employment policies, it might be more likely to observe a hiring freeze, than a reduction in the current level of public administration employment.

Data and method

In order to show how our methodological approach relates to alternative measures, we begin with a discussion of the advantages and disadvantages of existing statistical sources. Thereafter, we explain the construction of our dataset.

Review of statistical sources

Measuring public employment in a comparative perspective is exacerbated by various methodological issues; comparative statistical sources tend to employ very different measurement concepts, present data has been aggregated on different state levels (central, federal, local) or simply cover rather short time periods. In order to answer our research question, however, it is essential to obtain cross-sectional time series information, as we are going to explore the dynamics between processes of downsizing and growing government employees' compensation expenditure. Besides early attempts of collecting cross-national public employment figures by Rose et al. (1985), Cusack (1998) provides a full dataset on annual public employment in 21 OECD nations from 1960 to 1995. Drawing on OECD National Income Accounts (NIA), Cusack measured public employment as overall public sector employment. Unfortunately, due to methodological issues, the OECD decided not to continue reporting public employment in NIA after the mid 90s. As this dataset is, in our view, still the most comprehensive attempt to provide comparative public

employment data across OECD nations, we will use it as a reference point for our own attempt to collect more current data on public administration employment.

Among international statistical sources, the World Bank, ILO and the OECD provide comparative public employment data. The World Bank's (1999) "Cross-National Data on Government Employment & Wages" covers a range of 209 countries but contains no information on several core OECD countries. As it presents averaged employment data for two periods - 1990-1995 and 1996-2000 - the strength of the World Bank's (1999) dataset clearly lies in cross-sectional analyses. The ILO (2008) database on "Public Sector Employment" does offer cross-sectional time-series data for the majority of OECD countries. Here, the primary concern, however, lies in the use of non-comparable measurement concepts, which makes it virtually impossible to draw on cross-national variation in public employment. The OECD (2002) "Public Sector Pay and Employment Database" provides a strongly unbalanced public employment panel dataset covering 20 OECD nations between 1985 and 2000. Due to its measurement inconsistencies, the OECD decided not to update this database any longer and is instead currently developing a new dataset (OECD (2007) "Comparison of Employment in the Public Domain"), which is consistent with the United Nation's System of National Accounts (SNA).

As this preliminary review indicates, there is no dataset available that would allow us to explore the functional relationship between the size and the costs of public employment in a coherent manner. On this basis, we have decided to revise official statistical sources and try to construct a new panel dataset on public employment in OECD nations.

Measurement concepts

The ILO (2009) "Key Indicators of the Labor Market" (KILM) Program reports sectoral employment figures derived from the European Labor Force Survey, the Household and Labour Force Survey and official ILO estimates. These figures can be disaggregated by the International Standard Industrial Classification of all Economic Activities (ISIC -Revisions 3, 1990), which distinguishes 19 employment sectors. For our purposes Category L is of particular interest as it includes respondents working in the public administration, defence and compulsory social security. Since we are interested in "core" public administration employment, we subtract the number of people working in the defence sector[1]. Information on the size of the military personnel is obtained from the National Material Capabilities Dataset (v. 3.02) provided by the Correlates of War (2009) project[2]. This approach is consistent with Cusack (1998). Employing data obtained from representative repeated population surveys allowed us to trace back the development of the size of public administration employment from 1995 to 2005 in 17 OECD countries. We measure public administration employment as the share of the working age population, which is defined as people between the ages of 15 to 64. In line with Cusack (1998), we suggest that the working age population is a more appropriate denominator than total employment, as the latter is sensitive toward business cycle fluctuations. One should note that our measure is rather conservative in the sense that we are focusing on public administration employees. Public personnel in

national industries or public services (railway, postal service, telecommunication, etc.) are excluded from this definition. Moreover, we have deliberately decided not to include health and education sector employees, as we are not able to distinguish between those employed by the state and those having a private employment contract.

The second measure captures the fiscal side - the costs - of public employment. Table IV of the OECD's (2009) Classification of the Functions of Government (COFOG) provides information on public expenditure on government employees' compensation. Following Parry (2007), we measure the costs of employee compensation as a share of GDP. Alternatively, we measure the costs of employee compensation as a share of total government expenditure. Whereas the first measure provides and overall indicator for the amount of public resources devoted to public employment, the latter captures the relative importance of employees' compensation expenditure in the governments' budget. It is important to note that this expenditure measure is not totally congruent with our measure of the size of public employment. Whereas the cost-measure covers government expenditure on employees' compensation for all functions of the government, the size-measure covers only public administration employees. Given the limitations of secondary data analyses we have to explore the effects of overall government employees' compensation expenditure on public administration employment. Hereby, we are able to say that we have exclusively people with a public-working contract on the employee-side and exclusively public expenditure on the cost-side. This approach allows us to obtain cross-sectional time-series data on government employees' compensation expenditure for 17 OECD countries from 1995 to 2005. As the mid 90's have been characterized as the high times of public sector reform (Pollitt and Bouckaert 2004) and growing fiscal pressure on government budgets (e.g. Maastricht criteria), we expect that observing this decade is particularly relevant for an exploration of the functional relationship between the size and the costs of public employment.

Statistical model

In order to trace processes of public administration employment downsizing and increasing personnel compensation costs, we primarily employ descriptive statistics. In testing whether growing compensation costs cause a decrease in public administration employment, we draw on multivariate regression analysis. We distinguish between two statistical models, one focusing on long-term effects and another exploring short-term effects. The long-term model seeks to explain structural change in public administration employment rather than annual fluctuation. Therefore, we reduced the annual observations to three time points - 1995, 2000 and 2005 - and estimate a country fixed effects model with period effects. The fixed effects estimator, which exploits within unit variation, offers to dispense the random effects assumption and still obtains unbiased and consistent estimates when unit effects are arbitrarily correlated with explanatory variables (Halaby 2004: 516).

With the short-term model we seek to explain variation in public administration employment growth on an annual basis. The underlying dynamic panel regression model takes the following form:

$$pae_{i,t} = \beta_1(pae_{i,t\text{-}1}) + \beta_2(pece_{i,t\text{-}k}) + \beta_3(def_{i,t\text{-}k}) + \beta_5(unr_{i,t\text{-}k}) + \beta_5(gdp_{i,t\text{-}k}) + \sum \beta_n i + \sum \beta_n t + \varepsilon_{i,t}$$

where paei,t represents the annual growth rate of public administration employment as a share of the working age population in country i in year t. The costs of public employment (pece) are measured as the growth rate of government employees' compensations expenditure as a share of GDP[3]. Results of the augmented Dickey-Fuller test indicate that our dependent and main independent variables are non-stationary. Thus, we use a model in growth rates rather than levels[4]. The second specification issue concerns autocorrelation. Autocorrelation in the residuals is known to be a source of inefficient estimates. We model the autoregressive process by including a lagged dependent variable (Kittel and Winner. 2005; Kittel. 2008). We do so on the assumption that toady's decision to increase public employment depends on the employment decision in the previous year.

Hypothesizing that policy makers reduce public administration employment in response to growing personnel costs, we expect that the estimated coefficient for compensation expenditure will have a negative sign. The difficulty in exploring the effect of growing personnel costs on public administration employment growth is to specify the temporal lag until the political decision to reduce public employment growth translates into a reduction of public employment. Since there is no empirical or theoretical guidance on the appropriate lag structure, we let k range from 1 to 3 years, even though we acknowledge that expecting all 17 countries to have the same lag structure is a strong *ad hoc* assumption[5]. We estimate our model with panel corrected standard errors (Beck and Katz. 1995). Finally, each dynamic panel model includes a full set of country and time dummies.

Taking into account prior studies exploring determinants of public employment (Cusack, et al. 1989; Pennings. 1999), each statistical model includes three control variables: the unemployment rate (unr), deficit per GDP (def) and GDP per capita (gdp). Assuming governments follow an anti-cyclical public employment policy in order to reap electoral benefit, growing unemployment is predicted to have a positive effect on public employment growth. The other two measures concern fiscal constraints and economic development. We expect that growing deficits cause a reduction in the growth of public employment whereas growing GDP per capita should have the opposite effect (Cusack, et al. 1989).

Empirical analysis

The empirical analysis proceeds in three steps. First, we explore the size of public administration employment, focusing on the cross-sectional dimension. Second, we explore the development of absolute and relative public personnel expenditure. For the descriptive analysis we arrange countries by their legal origin. Following La Porta et al. (1998), countries were distinguished according to four legal traditions: civil/German, civil/French, civil/Scandinavian and a common law tradition[6]. In a previous paper we found that the legal origin provides a useful proxy for the relative openness of a country toward NPM reforms (Tepe, et al. 2008). In this respect, it seems that administrative culture in common law and

civil/Scandinavian law countries is more compatible with these ideas, whereas NPM reforms are more challenging in civil/German and civil/French law tradition (Pollitt and Bouckaert. 2004). Finally, we present multivariate estimation results on the functional relationship between the size and the costs of public employment.

Legal origin	Country	KILM	Cusack	Year
Civil/German	Austria	13.1	13.4	1995/94
	Czech Republic	11.7	na	1995/95
	Germany	13.8	8.5*	1995/91
Civil/French	Belgium	na	9.5	1995/94
	Greece	6.5	3.6	1995/93
	Italy	10.6	8.4	1995/94
	Luxembourg	12.4	na	1995/95
	Netherlands	17.5	6.2	1995/95
	Portugal	11.8	10.7	1995/95
	Spain	7.3	5.8	1995/95
Civil/Scandinavia	Denmark	21.7	20.8	1995/95
	Finland	16.1	13.4	1995/95
	Norway	23.1	21.7	1996/95
	Sweden	22.4	21.6	1995/95
Common	Canada	15.8	13.8	1995/95
	Ireland	10.7	8.6	1995/95
	United Kingdom	16.5	9.1	1995/95

Table 1. Comparing public sector employment (share of working age population)

Note: *KILM refers to Public administration, compulsory social security (L, without defense), Education (M), health and social work (N) as a share of the working age population (15 to 64). Cusack refers to central government employment (cgewap) as a share of the working age population (15 to 64). * Only West Germany. Year = Since the two datasets do not cover the same time points, the first entry refers to the KILM and the second to the Cusack dataset.*

Public administration employment

Before we explored the absolute size of public administration employment in numerical terms, we investigated how our new measures relate to prior attempts to obtain comparative public employment data. Table 1 presents public sector employment figures based on the KILM data and Cusack's (1998) measure of civilian general government employment. Both variables are denominated by the working age population. The KILM measure draws on the ISIC classification defining the public sector as public administration and compulsory social security (L), education (M), health and social work (N). Using this broad definition, we see a considerable

amount of overlapping between the two measures (e.g. Portugal, Austria, Canada, Denmark, Finland, Norway, Sweden) indicating that employment survey data tends to provide a useful substitute for aggregate public sector employment figures.

Legal origin	Country	Public administration employment			Education sector employment			Health sector employment		
		1995	2005	Change	1995	2005	Change	1995	2005	Change
Civil/ German	Austria	3.9	4.1	0.2	4.0	4.0	0.0	5.3	6.3	1.0
	Czech Republic	3.3	4.1	0.7	4.4	4.1	-0.3	4.0	4.5	0.5
	Germany	4.6	3.5	-1.1	3.3	3.8	0.5	5.9	7.5	1.6
	Av.	3.9	3.9	0.0	3.9	4.0	0.1	5.1	6.1	1.1
Civil/ French	Belgium	3.4	5.5	2.1	na	5.7	na	na	7.5	na
	Greece	0.9	2.6	1.7	3.2	4.4	1.1	2.4	3.1	0.7
	Italy	3.8	3.3	-0.4	3.6	4.0	0.3	3.2	4.0	0.8
	Luxem-bourg	3.9	5.2	1.3	3.6	4.8	1.1	4.9	7.5	2.6
	Nether-lands	4.4	4.5	0.1	4.2	4.7	0.5	8.9	11.0	2.2
	Portugal	4.1	4.3	0.2	4.7	4.4	-0.3	3.0	4.6	1.6
	Spain	2.1	3.6	1.5	2.7	3.7	1.0	2.5	3.9	1.4
	Av.	3.2	4.2	0.9	3.7	4.5	0.6	4.1	5.9	1.5
Civil/ Scandi-navia	Denmark	4.0	4.2	0.2	5.3	6.1	0.8	12.4	13.3	0.9
	Finland	3.2	2.8	-0.4	4.1	4.8	0.7	8.7	10.5	1.7
	Norway	3.8*	3.7	-0.1	5.9	6.4	0.4	13.4	15.4	2.0
	Sweden	2.4	4.9	2.5	5.2	8.2	3.0	14.8	12.3	-2.6
	Av.	3.3	3.9	0.6	5.1	6.4	1.2	12.3	12.8	0.5
Common	Canada	3.8	3.6	-0.3	4.8	5.1	0.3	7.2	7.9	0.8
	Ireland	2.3	3.4	1.1	3.8	4.4	0.5	4.5	6.7	2.2
	United Kingdom	3.6	4.7	1.1	5.3	6.7	1.4	7.6	9.1	1.5
	Av.	3.3	3.9	0.6	4.6	5.4	0.7	6.4	7.9	1.5
Mean		3.38	4.00	0.62	4.26	5.02	0.76	6.79	7.95	1.16
Std.		0.95	0.80		0.89	1.22		3.94	3.57	
CoV		0.28	0.20		0.21	0.24		0.58	0.45	

Table 2: Decomposing public sector employment into public administration employment

Note: *Measures as a share of working age population 15-65. Based on the International Standard Industrial Classification of all Economic Activities (ISIC) Revision 3 (1990), * refers to 1996.*

The disadvantage of using overall public sector employment, however, is that we are no longer able to distinguish whether employees have a public or private working contract as employment in the health and education sector can be organized publicly or privately (e.g. Beveridgean vs. Bismarckian style health systems).

To pinpoint the development of "core" public administration employment, Table 2 decomposes the KILM public sector employment measure into public administration, education and health sector employment[7]. Focusing on the level of public employment, we find that health sector employment (6.79 % in 1995 and 7.95 % in 2005) exceeds the other two sectors. On average, civil/Scandinavia countries have the highest share of health sector employees, followed by common, civil/German and civil/French countries. In absolute terms, public administration employment (3.38 in 1995 and 4.00 in 2005) represents the smallest fraction of public sector employment in all regimes. In order to locate where changes in public employment have taken place, we present mean period differences, the standard deviation (Std.) and the coefficient of variation (CoV) at the end of the table. We find the highest average mean differences and CoV in the health sector followed by education and public administration. Moreover, in the case of public administration employment, the variation between countries slightly decreased between 1995 and 2005. Compared to the other two sectors, differences in the level of public administration employment are relatively small; with a maximum of 5.5 (Belgium in 2005) and a minimum of 2.6 (Greece in 2005). Likewise, average values for the four legal regimes lay close together, indicating that the legal origin does not discriminate well when it comes to public administration employment rather than education or health sector employment. In sum, Table 2 suggests that stabilization and not radical downsizing has been the dominant pattern of public administration employment policies in the last decade.

Government employees' compensation expenditure

Table 3 presents the costs of public employment measured as total government employees' compensation expenditure as a share of GDP (absolute) and as a share of total government expenditure (relative)[8]. Exploring regime specific averages, we find that civil/Scandinavian countries have the highest employees' compensation expenditure in absolute and relative terms, followed by civil/French and common law countries, which lie on the same level, and civil/German countries with the lowest compensation expenditure. To this end, our findings are mostly consistent with Parry's (2007: 89) investigation of general public service spending on government employees' compensation. Exploring the variation in absolute and relative employees' compensation expenditure shows that the Std. and CoV hardly changed between 1995 and 2005. More telling, however, seems to be the development of average mean differences between these two years. Absolute compensation expenditure slightly decreased by 0.39 percent, whereas relative compensation expenditure increased by 1,61 percent. Independent from their legal regime affiliation the majority of our 17 OECD countries managed to decrease absolute employees' compensation expenditure. Against this trend, only three

countries - the Czech Republic, Portugal and Greece - increased absolute employees' compensation expenditure, which we suppose should be considered as an economic catch-up effect.

Legal origin	Country	Public employees' compensation expenditure Absolute (as a share of GDP)			Relative (share of total gov. exp.)		
		1995	2005	Change	1995	2005	Change
Civil/German	Austria	11.9	8.8	-3.1	21.6	18.0	-3.6
	Czech Republic	6.6	7.4	0.8	12.5	17.1	4.6
	Germany	8.0	7.0	-1.0	15.0	15.2	0.2
	Average	8.8	7.7	-1.1	16.4	16.8	0.4
Civil/French	Belgium	10.8	11.2	0.4	21.5	22.1	0.6
	Greece	9.3	10.1	0.8	21.1	24.7	3.6
	Italy	10.2	10.1	-0.1	19.9	21.5	1.7
	Luxembourg	8.0	7.8	-0.3	20.5	18.6	-1.8
	Netherlands	9.5	8.9	-0.5	17.3	20.4	3.1
	Portugal	11.9	13.4	1.5	28.5	29.0	0.5
	Spain	10.4	9.4	-1.0	24.2	25.2	1.1
	Average	10.0	10.1	0.1	21.8	23.1	1.2
Civil/ Scandinavian	Denmark	16.2	16.5	0.4	28.2	32.3	4.1
	Finland	14.4	13.2	-1.2	24.1	27.0	2.8
	Norway*	12.7	11.8	-1.0	27.7	29.1	1.4
	Sweden	15.6	15.1	-0.5	25.0	28.3	3.4
	Average	14.7	14.2	-0.6	26.2	29.2	2.9
Common	Canada	13.0	10.7	-2.3	27.8	28.5	0.7
	Ireland	9.2	8.9	-0.3	23.0	26.5	3.5
	United Kingdom	9.6	10.3	0.7	23.0	24.6	1.7
	Average	10.6	10.0	-0.6	24.6	26.5	1.9
Mean		11.01	10.62	-0.39	22.40	24.01	1.61
Std.		2.71	2.68		4.56	4.93	
CoV		0.25	0.25		0.20	0.21	

Table 3: Absolute and relative costs of public employment

Note: *Based on the OECD's Classification of the functions of government (COFOG), defense sector excluded.*

Concerning relative employees' compensation expenditure, findings provide tentative support for the Baumol cost disease, apart from Austria and Luxembourg, every single nation in our sample increased relative employees' compensation expenditure. This increase is largest in civil/Scandinavian countries, which already are on the highest expenditure level. Even though, this pattern is not a straightforward test of Baumol's argument, it indicates that personnel costs are a continuously

growing fraction of government expenditure. In contrast to naive cost-explosion arguments, Table 3 suggests that absolute reductions and relative increases in employees' compensation expenditure have taken place simultaneously.

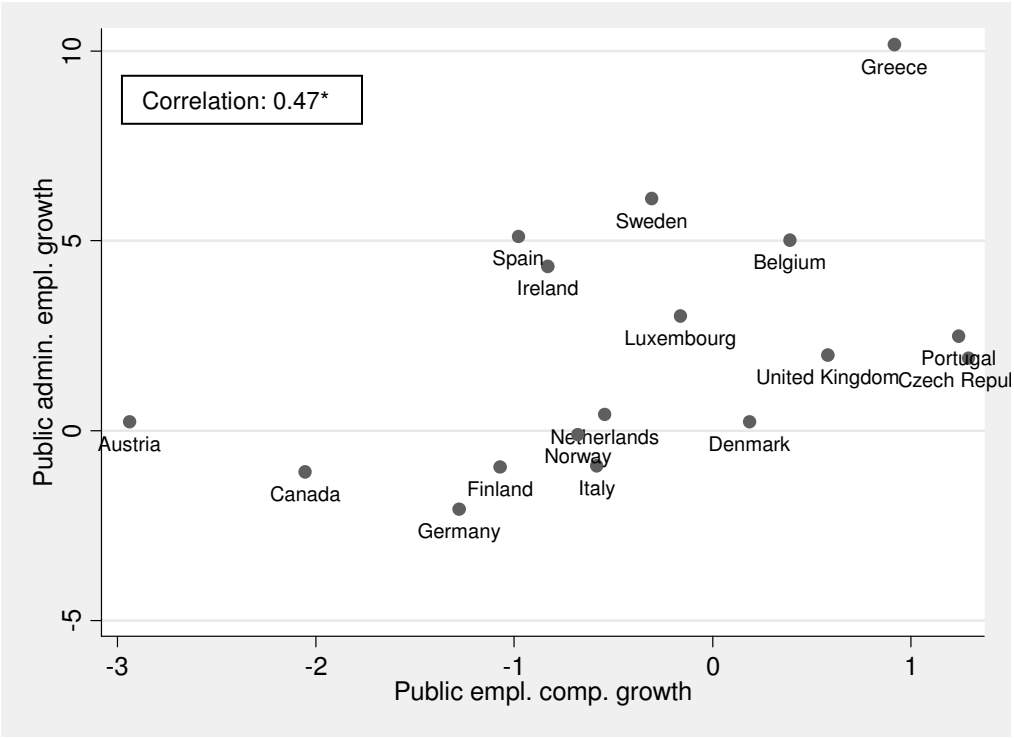

Figure 1: Long-term public administration employment and expenditure growth (1995-2005)

Note: *Public administration employment growth rate as a share of the working age population (15-64), Public employees' compensation expenditure growth as a share of GDP.*

Explaining the growth of public administration employment

The relationship between long-term growth of public administration employees as a share of the working age population and the long-term growth of government employees' compensation expenditure per GDP is represented in Figure 1. The preliminary scatter plot already indicates that long term growth in personnel costs is positively correlated with a long term growth in public administration employment (0.47*). In order to test whether higher levels of employees' compensation expenditure cause a reduction or "freezing" of public administration employment, we use a country-fixed effects model focusing on long-term changes within countries between 1995, 2000 and 2005. Model 1 and 2 in Table 4 suggest that higher levels of absolute government employees' compensation expenditure (pece) are associated with a higher level of public administration employment (pae). This pattern remains unchanged even after controlling for deficits, unemployment and GDP per capita.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	pae		*pae* (growth) k = 1 Year lag		*pae* (growth) k = 2 Year lag		*pae* (growth) k = 3 Year lag	
Model	FE (3 Periods)		FD / FE		FD / FE		FD / FE	
Estimator	OLS/robust		OLS/PCSE		OLS/PCSE		OLS/PCSE	
Lagged Dep.			-0.29	-0.33	-0.32	-0.37	-0.34	-0.38
			[0.23]	[0.22]	[0.26]	[0.23]	[0.25]	[0.23]
pece (per GDP)	0.29*	0.32*	0.21	-0.026	0.5	0.54	0.51	0.96
	[0.14]	[0.18]	[0.36]	[0.51]	[0.39]	[0.52]	[0.44]	[0.61]
Deficit		0.04		-0.78*		0.49		0.089
		[0.07]		[0.47]		[0.64]		[0.65]
Unemployment rate		0.01		2.29		4.13***		1.03
		[0.06]		[1.73]		[1.59]		[1.87]
GDP capita log		0.74		-15.2		0.069		74.9*
		[0.87]		[32.4]		[34.3]		[40.7]
Year dummy 2000	0.58**	0.15						
	[0.21]	[0.54]						
Year dummy 2005	0.75**	0.19						
	[0.27]	[0.80]						
Observations	48	48	150	143	136	127	120	111
Number of ID	16	16	16	16	16	16	16	16
R-squared	0.332	0.369	0.363	0.391	0.379	0.442	0.391	0.444

Table 4: Explaining public administration employment (1995-2005)

Note: *PAE = Public administration employment as a share of working age population, PECE = Public employees' compensation expenditure as a share of GDP, FE = Fixed effects, FD = First difference, OLS = Ordinary least squares, robust = robust standard errors in brackets, PCSE = Panel corrected standard errors on brackets, Model 1-2 = all independent variables entered in levels without lag, Model 3-8 = independent variables entered in first difference, lagged by k, constant, country & time effects included but not reported, panel corrected standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1, country and time effects jointly significant in each model, * CZR has been excluded due to missing deficit data.*

Next, we switch to dynamic panel regression, which explores the effect of annual government employees' compensation expenditure growth on annual public administration employment growth. Note that all variables now enter the equation in growth rates and are lagged by k years. In none of the six models, government employees' compensation expenditure growth rate exerts a statistically significant effect on public administration growth. More compelling are estimation results on the effect of change in annual deficits per GDP and unemployment rate. As suggested, we find that growing deficits decrease the growth rate of public administration employment. In this respect, it is not the costs of government employees' compensation as such, but fiscal constraints in general that cause a decline in public administration employment growth. After one year, already, growing deficits led to a reduction in the growth rate of public administration

employment (Model 4). Findings on the effect of growing unemployment are consistent with prior findings by Cusack et al. (1989) suggesting that public employment policies follow an anti-cyclical logic. With a two-year lag, growing unemployment can be associated with an increase in the growth rate of public administration employment (Model 6).

In sum, Table 4 suggests that neither in the long-term nor in the dynamic short-term analysis there is any empirical support for the hypothesis that policy-makers reduce pubic administration employment in response to growing personnel costs. If anything, estimation results suggest that in the long-run higher shares of government employees' compensation expenditure are associated with higher shares of public administration employment.

Concluding remarks

This study explored the development of the size and the costs of public administration employment across 17 OECD nations within the last 10 years. In contrast to prior statistical sources, we utilized aggregate employment survey data from the ILO's KILM Program, focusing on public administration rather than overall public sector employment. In combination with the information on government employees' compensation expenditure, taken from the OECD's COFOG database, we were able to analyse the development of the size and the costs of public employment in a coherent cross-sectional time-series setting. The empirical findings can be summarized as follows: First, decomposing public sector employment into public administration, education and health sector employment indicates that countries do not vary much in the size of "core" state employment nor has the level of public administration employment changed substantially in the last 10 years. These findings suggest that stabilization and not radical downsizing has been the dominant pattern of public administration employment policies. The stasis is somewhat puzzling as it seems to contradict more qualitative oriented research on NPM, which indicates that public administration modernization has taken place in several OECD nations (Pollitt and Bouckaert 2004). Second, exploring government employees' compensation expenditure, we find that in contrast to naive cost-explosion arguments, absolute reductions and relative increases in compensation expenditure take place simultaneously. Although public employees' compensation expenditure appears to demand a growing fraction of government budgets, which provides tentative evidence in support of Baumol's cost disease, the majority of countries managed to contain or even reduce absolute public personnel expenditure. Thirdly, findings from the multivariate panel regression on the functional relationship between the costs and the size of public administration employment do not indicate that growing government employees' compensation expenditure causes a decrease in public administration employment. In this respect, we conclude that not personnel costs in particular but fiscal constraints and anti-cyclical public employment policies are the driving factors behind public administration employment growth.

As the size of public administration employment has hardly changed over time, whereas absolute public personal expenditure has been slightly reduced or contained at a given level, further comparative research might benefit from exploring more qualitative changes in public administration employment. Although our estimation results indicate that growing personnel costs have not affected aggregate public administration employment, this does not preclude reforms affecting public employees' working conditions. Outsourcing of public services to private companies (e.g. facility management) or substituting full-time contracts by part-time contracts, for example, can be considered as two more implicit reform options to contain public employment compensation costs.

In total, this study suggests that by decomposing public sector employment into health sector, education sector and public administration employment we find that "core" state employment has hardly changed in the last 10 years. Similarly, there is no indication of a drastic increase in public personnel expenditure, even though the descriptive analysis indicates that personnel costs represent a growing fraction in government spending. Thus far, contrary to alarmist predictions, these results neither provide empirical support for a looming public personnel cost-explosion nor a radical downsizing of public administration employment.

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[1] The number of employees in sector L for Belgium has been extrapolated for 1995 to 2000. Reported data for this period comes from a different source than the source used before and after this period. Thus, we choose to interpolate on the basis of a single, consistent data source.

[2] Due to missing data points we had to extrapolate military personnel for 2002 to 2005.

[3] Alternatively we use government employees' compensation expenditure denominated by total government expenditure. Using the alternative denominator does not affect substantial effect. See Appendix Table 3.

[4] Appendix Table 2 confirms that expenditure on government employees' compensation is also non-stationary.

[5] Alternatively one might consider using a vector autoregression (VAR) model. However, due to the limited length of our time series, this approach remains unfeasible.

[6] According to the CIA Fact Book the Czech Republic has a civil/German legal tradition.

[7] Unfortunately, France does not report public administration employment via KILM before 2003. In 2005 public administration employment as a share of the working age population amounts 5.4 percent, education sector employment amounts 4.3 percent and health sector employment amounts 7.5 percent.

[8] In France, absolute government employees' compensation expenditure amounts 12.4 percent in 1995 and 12.3 percent in 2005, whereas relative government employees' compensation expenditure amounts 23.9 percent in 1995 and 23.7 percent in 2005.

Appendix

Table A. 1. Variables and Sources

Variable	Definition	Source
pae	Public administration employment (share of working age population 15-65)	ILO / KILM, Correlates of War
pece	Government employees' compensation expenditure (GDP = share of GDP) or (Gov. = as a share of total government expenditure)	OECD / COFOG
def	Annual deficit (government primary balance) as a percentage of GDP.	Armingeon et al. (2009)
unr	Unemployment rate as a percentage of civilian labor force.	Armingeon et al. (2009)
gdp	GDP per capita (log)	OECD National Accounts

Table A. 2. Panel unit root test: Size of public administration employment

Note: Fisher Test for panel unit root using an augmented Dickey-Fuller test

		Public admin. employment	
		Level	Growth rate
No Trend			
	chi2(34)	36.73	187.64
	Prob > chi2	0.34	0.00
Trend			
	chi2(34)	33.44	137.39
	Prob > chi2	0.49	0.00
		Public empl. compensation	
		Level	Growth rate
No Trend			
	chi2(34)	34.97	115.58
	Prob > chi2	0.42	0.00
Trend			
	chi2(34)	21.98	92.57
	Prob > chi2	0.94	0.00

Figure A. 1. Public administration employment and public expenditure on government employees' compensation

Note: Public administration employment as a share of working age population, Public employees' compensation expenditure as a share or GDP.

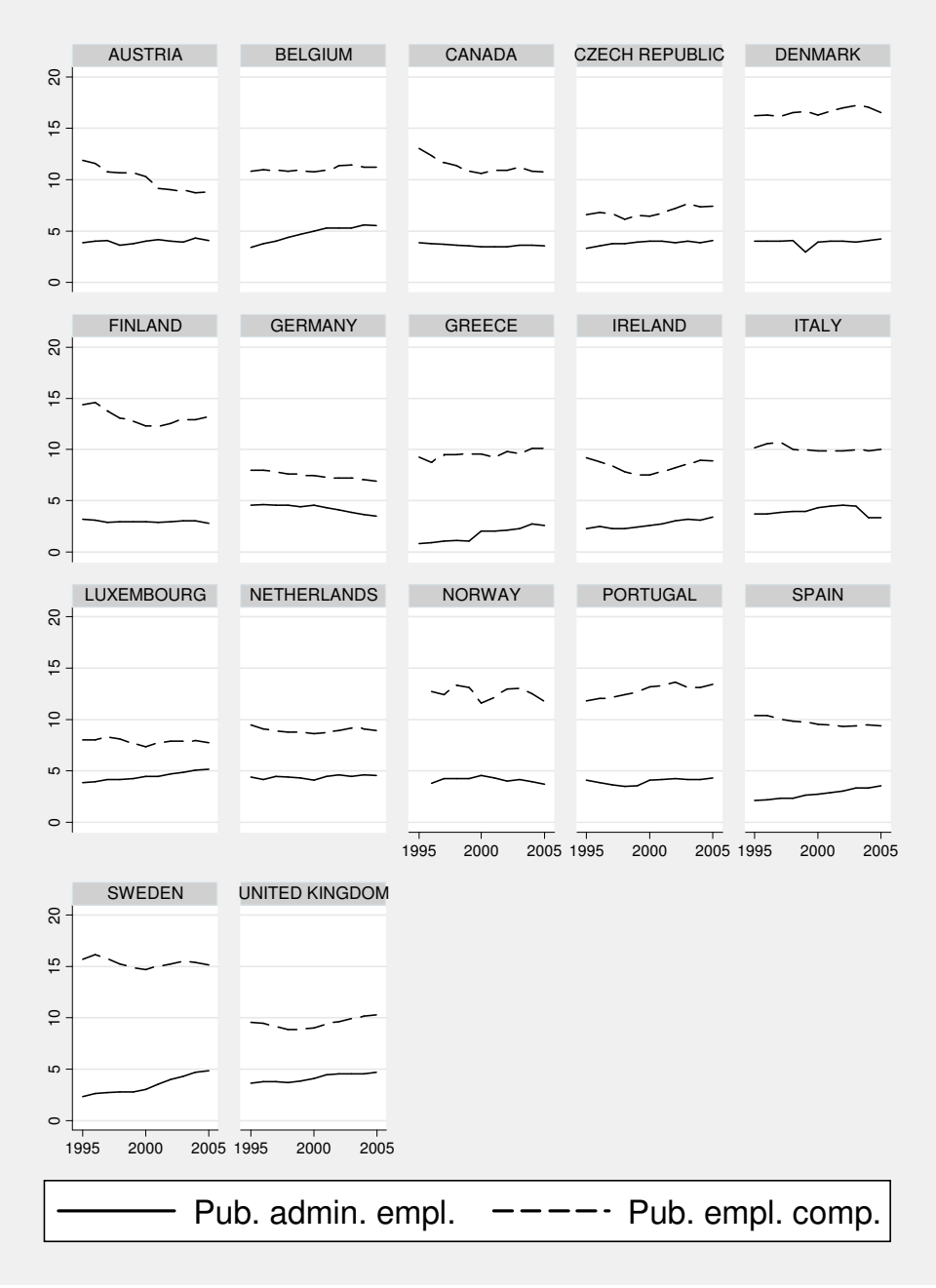

Table A. 3. Explaining public administration employment (1995-2005)

Note: *PAE = Public administration employment as a share of working age population, PECE = Public employees' compensation expenditure as a share of GDP, FE = Fixed effects, FD = First difference, OLS = Ordinary least squares, robust = robust standard errors in brackets, PCSE = Panel corrected standard errors on brackets, Model 1-2 = all independent variables entered in levels without lag, Model 3-8 = independent variables entered in first difference, lagged by k, constant, country & time effects included but not reported, panel corrected standard errors in brackets, *** p<0.01, ** p<0.05, * p<0.1, country and time effects jointly significant in each model, * CZR has been excluded due to missing deficit data.*

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	pae		*pae* (growth) k = 1 Year lag		*pae* (growth) k = 2 Year lag		*pae* (growth) k = 3 Year lag	
Model	FE (3 Periods)		FD / FE		FD / FE		FD / FE	
Estimator	OLS/robust		OLS/PCSE		OLS/PCSE		OLS/PCSE	
Lagged Dep.			-0.29	-0.32	-0.33	-0.39*	-0.33	-0.38
			[0.23]	[0.22]	[0.25]	[0.23]	[0.26]	[0.25]
pece (Gov.)	0.063	0.039	0.025	0.16	0.53	0.76*	0.34	0.72
	[0.081]	[0.093]	[0.36]	[0.42]	[0.39]	[0.43]	[0.42]	[0.53]
Deficit		-0.0094		-0.83		-0.29		-0.97
		[0.059]		[0.57]		[0.69]		[0.82]
Unemployment rate		0.015		2.33		4.58***		1.62
		[0.065]		[1.79]		[1.62]		[2.08]
GDP capita log		0.94		-11.9		-8.25		50.1*
		[0.97]		[22.0]		[24.7]		[29.2]
Year dummy 2000	0.27	0.0083						
	[0.18]	[0.56]						
Year dummy 2005	0.52*	-0.09						
	[0.28]	[0.83]						
Observations	48	48	150	143	136	127	120	111
Number of ID	16	16	16	16	16	16	16	16
R-squared	0.255	0.298	0.36	0.392	0.381	0.462	0.381	0.432

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